C3 cncld. a magnetic sensor outputting a signal in response to a variation of a magnetic flux density on the circular path.

REMARKS

Claims 1-11, and 13 were pending in the present application. Claim 1 has been amended and claims 3, 9, and 11 have been cancelled. Claims 16-18 have been added. Therefore, claims 1, 2, 4-8, 10, 13, and 16-18 are pending in the application.

Support for the claim amendments can be found in the specification. Support for the new claims can be found in original claims 3, 8, 9, and 11 and the specification. Accordingly, Applicant respectfully submits that no new matter has been added.

Based on the above amendments and following remarks, Applicant respectfully requests reconsideration of all outstanding rejections.

Allowable Subject Matter

Applicant thanks the Examiner for indicating that claims 3, 9, and 11 would be allowable if rewritten in independent form to include all of the limitations of the base claim, claim 1. In response, Applicant has added new claims 16, 17, and 18, which are independent claims containing the subject matter of claims 3, 9, and 11, respectively, as well as the subject matter of claim 1 and, in the case of claim 17, also the subject matter of claim 8. A comparison between original claim 1 and new claims 16, 17, and 18 can be seen in the papers appended to this response.

Claim Rejections Under 35 U.S.C. § 102

In the Office Action, claims 1, 2 and 4-8 were rejected under 35 U.S.C. § 102(e) as being anticipated by Nagate et al. (USP 5,864,192). Applicant respectfully submits that the rejection is improper as to claim 1 even before the amendments proffered above for clarity, and that these claims are allowable for the reasons which follow.

To anticipate a claim under 35 U.S.C. § 102(e), each and every element as set forth in the claim must be found, either expressly or inherently, in a single prior art reference. MPEP § 2131. It is respectfully submitted that claim 1 is allowable for the reason that this requirement is not satisfied by Nagate.

Applicant argued at page 4 of the previous response that "Nagate does not teach . . . that the plates are magnetized by leakage flux of the corresponding magnet, as recited in claim 1." The PTO did not respond to this point of distinction. Indeed, Nagate does not disclose, teach, or suggest that each of the plates is magnetized by a leakage flux of the nearby corresponding magnet. If, for example, the laminated steel plates of Nagate are made of a nonmagnetic material (a possibility that is not precluded by the disclosure of Nagate), then the plates would not be magnetized. Further, the only leakage flux disclosed by Nagate is that which "is leaked outside from the rotor end face 8b" (col. 10, lines 54-55), and corresponds to W_1 and W_2 in Fig. 3 (not W_0, which is used to spin the rotor 8). However, neither W_1 nor W_2 magnetizes any plates. Thus, claim 1 was not fully met even before the above-proffered amendments, and the rejection should be withdrawn on this basis alone.

Moreover, Nagate suggests attaching a nonmagnetic plate 8c to the rotor end face 8b in order to reduce or smooth the flux leaking out to magnetic sensor 16. "Since the route of the magnetic flux is smoothed, the analogue waveform of magnetism detected by the magnetic sensor 16 is smoothed . . . ." (column 10, lines 57-59) This stands in stark contrast to Applicant's invention, where the plates are magnetized to produce a sharp variation when the space between the plates passes the magnetic sensor. (see specification pages 6-7 and Figures 3 and 4A-4D) As such, claim 1 is not anticipated by Nagate for at least the reason that Nagate does not teach plates being magnetized by a leakage flux of nearby corresponding magnets, where the leakage flux is a magnetic flux which is not created by the coils of the stator.

In addition, Nagate does not even disclose a detector that comprises plates. This deficiency of Nagate was also argued in Applicant's previous response. In the Final Office Action, it is stated that "the features upon which [A]pplicant relies (i.e. plates are part of the detector) are not recited in the rejected claim(s)." (Office Action, page 5, paragraph 8, emphasis added) In reply, Applicant points to the language immediately before and after the transitional phrase "comprising" in claim 1: "the detector comprising: plates of the same number as the magnets, the plates being made of a magnetic material, ..." Applicant further points to MPEP § 2111.03, which states that the "transitional term 'comprising,' which is synonymous with 'including,' 'containing,' or 'characterized by,' is

inclusive or open-ended . . . . 'Comprising is a term of art used in claim language which means that the named elements are essential, ...'" (MPEP § 2131, second paragraph, citations omitted). It is respectfully submitted that the language "the detector comprising: plates" in claim 1 clearly requires that the plates be part of the detector.

These plates are an important part of Applicant's invention. As discussed above, the plates create the characteristic detection signals shown in Figure 4C. In Applicant's invention, the plates 25 must be part of the detector. Conversely, in Nagate, it is the flux directly created by permanent magnets 11 (or, in an alternative embodiment, magnet piece 17, as disclosed in col. 17, lines 13-48) that is detected by magnetic sensor 16. Nagate does not disclose that rotor magnetic pole portions 8a (or its constituent laminated steel plates) play any role whatsoever in the detection by magnetic sensor 16, and therefore are not a part of the detector (or detection system) of Nagate. As such, since the plates of Nagate are not part of the detector, Nagate does not anticipate claim 1 for this additional reason (which also does not rely on any amended language in claim 1).

Claim 1, as amended, also contains the limitation that the detector forms part of an electric motor, where the motor has a stator provided with a plurality of coils. Amended claim 1 also contains the added limitation that the leakage flux is a magnetic flux which is not created by the coils of the stator. Support for this limitation is found on page 8 of the specification.

It is respectfully submitted that claims 2, and 4-8 are allowable for at least the reason that these claims depend from claim 1.

Claim Rejections Under 35 U.S.C. § 103(a)

In the Office Action, claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Nagate et al. in view of Masuzawa et al. Also, claim 13 was rejected under 35 U.S.C. 103(a) as being unpatentable over Nagate et al in view of ordinary skill in the art. Applicant respectfully submits that claims 10 and 13 are allowable for at least the reason that the claims depend from claim 1, which, as seen above, is allowable.

New Claims

As noted above, new claims 16-18 are independent claims containing the limitations of claims 3, 9, and 11, respectively, as well as the limitations of claim 1. These claims are written in response to the indication that claims 3, 9, and 11 are directed to allowable subject matter. A comparison between original claim 1 and new claims 16, 17, and 18 can be seen in the papers appended to this response.

Conclusion

Applicant believes that the present application is in condition for allowance, quite apart from the amendments proposed to claim 1. Realizing that the stated rejection of claim 1, before amendment, is improperly grounded, the PTO should proceed to allow claim 1 and enter the proposed amendment. Entry of the present claim revisions and of the new claims and favorable reconsideration are requested. Applicant offers to send his representatives to the PTO if the Examiner feels that an interview will advance prosecution.

If Applicant has not accounted for any fees required by this Amendment, the Commissioner is hereby authorized to charge to our Deposit Account No. 19-0741. If Applicant has not accounted for a required extension of time under 37 C.F.R. § 1.136, that extension is requested and the corresponding fee should be charged to our Deposit Account.

Respectfully submitted,

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By _____

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Version with Markings to Show Changes Made to Pending Claims

1. (Amended) A magnet pole position detector for a rotor that has a plurality of magnets disposed on a circular periphery, ~~and~~ rotates with a rotation shaft, **and forms a part of an electric motor that has a stator provided with a plurality of coils,** the detector comprising:

plates of the same number as the magnets, the plates being made of a magnetic material, each of the plates being disposed on the rotor at a position along a circular path nearby a corresponding magnet and magnetized by leakage flux on the corresponding magnet**, the leakage flux being magnetic flux which is not created by the coils of the stator**; and

a magnetic sensor outputting a signal in response to a variation of a magnetic flux density on the circular path.

Version Showing How New Claims Parallel Original Claim 1

16. (New) A magnet pole position detector for a rotor that has a plurality of magnets disposed on a circular periphery, and rotates with a rotation shaft, the detector comprising:

plates of the same number as the magnets, the plates being made of a magnetic material, each of the plates being disposed on the rotor at a position along a circular path nearby a corresponding magnet and magnetized by leakage flux of the corresponding magnet, **wherein the plates are fixed to an end face of the rotor, the end face facing in a direction along the rotation shaft**; and

a magnetic sensor outputting a signal in response to a variation of a magnetic flux density on the circular path.

17. (New) A magnet pole position detector for a rotor that has a plurality of magnets disposed on a circular periphery, and rotates with a rotation shaft, the detector comprising:

plates of the same number as the magnets, the plates being made of a magnetic material, each of the plates being disposed on the rotor at a position along a circular path nearby a corresponding magnet and magnetized by leakage flux of the corresponding magnet, **wherein the rotor comprises a rotor core retaining the magnets, and wherein the plates are fixed to the rotor core via an end plate made of a non-magnetic material**; and

a magnetic sensor outputting a signal in response to a variation of a magnetic flux density on the circular path.

18. (New) A magnet pole position detector for a rotor that has a plurality of magnets disposed on a circular periphery, and rotates with a rotation shaft, the detector comprising:

plates of the same number as the magnets, the plates being made of a magnetic material, each of the plates being disposed on the rotor at a position along a circular path nearby a corresponding magnet and magnetized by leakage flux of the corresponding magnet, **wherein the plates are provided in the form of a disk in which adjacent plates are separated by a radial groove formed on the disk**; and

a magnetic sensor outputting a signal in response to a variation of a magnetic flux density on the circular path.